**Objectives**

Upon completion of this activitiy, you will:

* Understand how chemical equilibrium explains how increasing CO2 in atmosphere and increasing global temperatures can affect the acidity of the oceans.

**Causal Principles**

1. Gravitational energy, thermal energy and/or chemical **energy** drive all movement and change of matter on Earth.

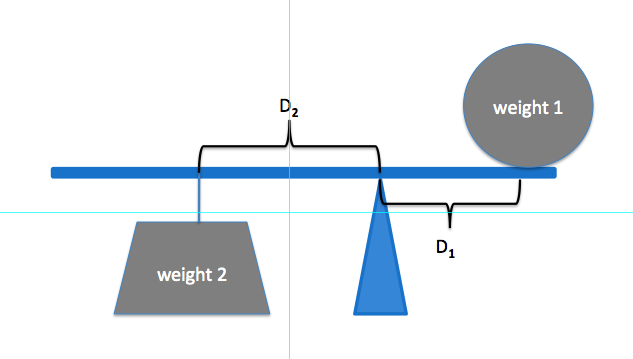
2. A system is in **equilibrium** when energy in the system is balanced.

3. Matter moves and changes to return a system to **equilibrium.**

4. **Energy** is needed to break bonds and is released when bonds form.

1. **Temperature** is a measure of the movement of molecules. Higher temperature means molecules are moving faster.

**PART 1: Background Notes**



**Class Notes**

Complete the tables below as we go over them in class.

|  |  |  |
| --- | --- | --- |
| Table A. See Saw and CO2 in the Ocean/Atmosphere | | |
| **See Saw** | **CO2** | **Principle** |
| Weight 1 |  |  |
| Weight 2 |  |  |
| Fulcrum |  |  |

|  |  |  |
| --- | --- | --- |
| Table B. See Saw and Ocean Acidification | | |
| **See Saw** | **Ocean Acidification** | **Principle** |
| Increasing Weight 2 |  |  |
| Impact of increasing Weight 2 on Weight 1 |  |  |
| Fulcrum |  |  |

**Part 2: Group Work**

In Table C, fill in the causal principles that match with the processes involved in ocean acidification. You may use more than one for each blank if they are relevant.

|  |  |  |
| --- | --- | --- |
| Table C. Causal Principles | | |
| **See Saw** | **CO2** | **Principle** |
| Increasing Weight 2 |  |  |
| Impact of Increasing Weight 2 on Weight 1 |  |  |
| Increasing Distance 2 |  |  |
| Decreasing Distance 2 |  |  |

In Table D, fill in the differences between a see saw and ocean acidification

|  |  |  |
| --- | --- | --- |
| Table D. Differences Between a See Saw and Ocean Acidfication | | |
| **See Saw** | **Difference** | **Oceans** |
|  | Type(s) of energy |  |
|  | What causes changes in the system?  Matter or energy? |  |

**Part 3: Homework**

If you complete the group work, you may work on the homework **on your own.** This means your answers should be generally unique from other students’ answers. **Submit your homework using ANGEL**.

1. Using the concept of chemical equilibrium, explain why increasing carbon dioxide in the atmosphere may lead to increased ocean acidification.
2. Using the concept of chemical equilibrium, explain why increasing global temperature may lead to a decrease in ocean acidity.